

Towards dipolar quantum many-body physics with ultracold polar molecules

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The long range dipolar interaction between polar molecules is expected to pave the way to the study of intriguing phenomena such as quantum magnetism, supersolids and novel anisotropic superfluids. In this talk, I will review recent experimental progress in the preparation, manipulation and control of polar molecules. In particular, I will discuss recent experiments on collisional properties of polar molecules in the quantum regime. This includes chemical reactions and their control via quantum statistical properties, dipolar interactions and confinement in reduced dimensions [1, 2, 3, 4, 5]. Furthermore, I will present experimental progress towards the preparation of ultracold ground state NaK molecules with a large dipole moment of about 2,7 Debye [6].

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